

In response to the Office Action, part of paper no. 3, mailed on February 4, 2003, please amend the claims as follows:

IN THE CLAIMS:

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Claim 1. (Original) A filter device comprising:

2 a housing having a first end;

4 a first ring joinable to said first end wherein said first ring has a first annular anchor on an interior portion of said first ring;

6 a first flange cap joinable to said first ring forming a first seal;

8 a plurality of microfibers extending from said first ring through said housing, and

10 a first potting material encasing said plurality of microfibers at said first ring and encasing said first annular anchor forming a second seal.  
12

Claim 2. (Original) : The filter device according to claim 2 1 further comprising:

a second end of said housing opposite said first end;

4 a second ring joinable to said second end wherein said second ring has a second annular anchor on an interior portion of said second ring;

6 a second flange cap joinable to said second ring forming a third seal;

8 a second potting material encasing said plurality of microfibers at said second ring and encasing said second annular anchor forming a fourth seal.  
10

Claim 3. (Original) The filter device according to claim 1 2 further comprising:

a first fluid inlet port through said first flange cap;

4 a first fluid outlet port through said second flange cap,  
wherein a first fluid pathway is defined by said first fluid  
6 inlet port, said plurality of microfibers, and said first fluid  
outlet port;

8 a second fluid inlet port through said housing and  
proximate to said first end; and

10 a second fluid outlet port through said housing and  
proximate to said second end, wherein a second fluid pathway is  
12 defined by said second fluid inlet port, a space between said  
plurality of microfibers, and said second fluid outlet port.

Claim 4. (Original) The filter device according to claim 1  
2 wherein each of said plurality of microfibers are hollow and  
semipermeable.

Claim 5. (Original) The filter device according to claim 1  
2 wherein said first annular anchor and said second annular anchor  
receive a surface treatment, wherein said surface treatment  
4 modifies a surface energy of said first annular anchor and said  
second annular anchor.

Claim 6. (Original) The filter device according to claim 5  
2 further comprising:

a first plurality of rounded ridges on an upper surface of  
4 said first annular anchor and a second plurality of rounded  
ridges on a lower surface of said first annular anchor; and

6 a third plurality of rounded ridges on an upper surface of  
said second annular anchor and a fourth plurality of rounded  
8 ridges on a lower surface of said second annular anchor;

wherein said first and second plurality of rounded ridges  
10 and said third and fourth plurality of rounded ridges on said  
first and second annular anchors minimize a delamination of said  
12 first and second potting materials from said first and second

annular anchors, and increases a surface area of said first and  
14 second annular anchors treatable through said surface treatment.

Claim 7. (Original) The filter device according to claim 6  
2 further comprising:

a first plurality of radial channels perpendicular to said  
4 first plurality of rounded ridges on said upper surface of said  
first annular anchor; and

6 a second plurality of radial channels perpendicular to said  
third plurality of rounded ridges on said upper surface of said  
8 second annular anchor;

wherein said first and second plurality of radial channels  
10 allow air to escape when said first and second potting material  
is applied to said filter device.

Claim 8. (Original) The filter device according to claim 1  
2 wherein said first ring is spin welded to said first end, said  
second ring is spin welded to said second end, said first flange  
4 cap is spin welded to said first ring, and said second flange  
cap is spin welded to said second ring.

Claim 9. (Original) The filter device according to claim 8  
2 further comprising:

a first plurality of nubs on an outer portion of said first  
4 ring; and

a second plurality of nubs on an outer portion of said  
6 second ring;

wherein said first and second plurality of nubs assist in  
8 said spin welding.

Claim 10. (Original) The filter device according to claim  
2 8 further comprising:

at least one annular channel located between said first  
4 ring and said first end; and

at least one annular channel located between said second  
6 ring and said second end;

wherein each of said at least one annular channel  
8 accommodates a flow of flash material during said spin welding.

Claim 11. (Original) The filter device according to claim  
2 8 further comprising:

at least one annular channel located between said first  
4 ring and said first flange cap; and

at least one annular channel located between said second  
6 ring and said second flange cap;

wherein each of said at least one annular channel  
8 accommodates a flow of flash material during said spin welding.

Claim 12. (Original) The filter device according to claim  
2 1 wherein said first ring is laser welded to said first end,  
said second ring is laser welded to said second end, said first  
4 flange cap is laser welded to said first ring, and said second  
flange cap is laser welded to said second ring.

Claim 13. (Original) The filter device according to claim  
2 1 wherein said housing is cylindrical in shape.

Claim 14. (Original) A filter device comprising:

2 a housing having a first end;

a first ring joinable to said first end wherein said first  
4 ring has a first annular anchor on an interior portion of said  
first ring;

6 a first flange cap joinable to said first ring forming a  
first seal;

8 a plurality of microfibers extending from said first ring  
through said housing;

10 a first potting material encasing said plurality of  
microfibers at said first ring and encasing said first annular  
12 anchor forming a second seal;

a first fluid inlet port through said first flange cap  
14 wherein a first portion of a first fluid pathway is defined by  
said first fluid inlet port and said plurality of microfibers;  
16 and

a second fluid inlet port through said housing and  
18 proximate to said first end wherein a first portion of a second  
fluid pathway is defined by said second fluid inlet port and a  
20 space between said plurality of microfibers.

Claim 15. (Original) The filter device according to claim  
2 14 further comprising:

a second end of said housing opposite said first end;

4 a second ring joinable to said second end wherein said  
second ring has a second annular anchor on an interior portion  
6 of said second ring;

a second flange cap joinable to said second ring forming a  
8 third seal;

a second potting material encasing said plurality of  
10 microfibers at said second ring and encasing said second annular  
anchor forming a fourth seal;

12 a first fluid outlet port through said second flange cap  
wherein a second portion of said first fluid pathway is defined  
14 by said second fluid outlet port and said plurality of  
microfibers; and

16 a second fluid outlet port through said housing and  
proximate to said second end wherein a second portion of said  
18 second fluid pathway is defined by said second fluid outlet port  
and said space between said plurality of microfibers.

Claim 16. (Original) The filter device according to claim  
2 14 wherein each of said plurality of microfibers are hollow and  
semipermeable.

Claim 17. (Original) The filter device according to claim  
2 14 wherein said first annular anchor and said second annular  
anchor receive a surface treatment, wherein said surface  
4 treatment modifies a surface energy of said first annular anchor  
and said second annular anchor.

Claim 18. (Original) The filter device according to claim  
2 17 further comprising:

a first plurality of rounded ridges on an upper surface of  
4 said first annular anchor and a second plurality of rounded  
ridges on a lower surface of said first annular anchor; and

6 a third plurality of rounded ridges on an upper surface of  
said second annular anchor and a fourth plurality of rounded  
8 ridges on a lower surface of said second annular anchor;

wherein said first and second plurality of rounded ridges  
10 and said third and fourth plurality of rounded ridges on said  
first and second annular anchors minimize a delamination of said  
12 first and second potting materials from said first and second  
annular anchors, and increases a surface area of said first and  
14 second annular anchors treatable through said surface treatment.

Claim 19. (Original) The filter device according to claim  
2 18 further comprising:

a first plurality of radial channels perpendicular to said  
4 first plurality of rounded ridges on said upper surface of said  
first annular anchor; and

6 a second plurality of radial channels perpendicular to said  
third plurality of rounded ridges on said upper surface of said  
8 second annular anchor;

wherein said first and second plurality of radial channels  
10 allow air to escape when said first and second potting material  
is applied to said filter device.

Claim 20. (Original) The filter device according to claim  
2 14 wherein said first ring is spin welded to said first end,  
said second ring is spin welded to said second end, said first  
4 flange cap is spin welded to said first ring, and said second  
flange cap is spin welded to said second ring.

Claim 21. (Original) The filter device according to claim  
2 20 further comprising:

a first plurality of nubs on an outer portion of said first  
4 ring; and

a second plurality of nubs on an outer portion of said  
6 second ring;

wherein said first and second plurality of nubs assist in  
8 said spin welding.

Claim 22. (Original) The filter device according to claim  
2 20 further comprising:

at least one annular channel located between said first  
4 ring and said first end; and

at least one annular channel located between said second  
6 ring and said second end;

wherein each of said at least one annular channel  
8 accommodates a flow of flash material during said spin welding.

Claim 23. (Original) The filter device according to claim  
2 20 further comprising:

at least one annular channel located between said first  
4 ring and said first flange cap; and

at least one annular channel located between said second  
6 ring and said second flange cap;

wherein each of said at least one annular channel  
8 accommodates a flow of flash material during said spin welding.

Claim 24. (Original) The filter device according to claim  
2 14 wherein said first ring is laser welded to said first end,  
said second ring is laser welded to said second end, said first  
4 flange cap is laser welded to said first ring, and said second  
flange cap is laser welded to said second ring.

Claim 25. (Original) The filter device according to claim  
2 14 wherein said housing is cylindrical in shape.

Claim 26. (Original) A filter device prepared by a process  
2 comprising the steps of:

(a) joining a first ring to a first end of a housing  
4 wherein said first ring has a first annular anchor on an  
interior portion of said first ring;

6 (b) inserting a plurality of microfibers within said  
housing that extend to said first ring;

8 (c) encasing said plurality of microfibers and said first  
annular anchor at said first ring with a first potting material  
10 forming a first seal; and

(d) joining a first flange cap to said first ring forming  
12 a second seal.

Claim 27. (Original) A filter device prepared by a process  
2 according to claim 26 wherein said encasing step (c) further  
comprises the steps (c1) through (c6):

4 (c1) attaching a first potting cap to said first ring to  
close off said first end;

6 (c2) placing said housing in a centrifuge to allow rotation  
about an axis of rotation perpendicular to a longitudinal axis  
8 of said housing, wherein said axis of rotation extends through a  
midpoint of said housing;

10 (c3) injecting said first potting material into said  
housing proximate to said first end;

12 (c4) spinning said housing in said centrifuge causing said  
first potting material to set and harden, encasing said  
14 plurality of microfibers and said first annular anchor at said  
first ring at said first end forming said first seal;

16 (c5) removing said first potting cap; and

(c6) cutting said first potting material and said plurality  
18 of microfibers at said first end through a first plane  
perpendicular to said longitudinal axis, exposing an interior  
20 channel of each of said plurality of microfibers at said first  
end.

Claim 28. (Original) A filter device prepared by a process  
2 according to claim 26 further comprising the steps of:

(e) joining a second ring to a second end of said housing  
4 wherein said second ring has a second annular anchor on an  
interior portion of said second ring;

6 (f) extending said plurality of microfibers within said  
housing to said second ring;

8 (g) encasing said plurality of microfibers and said second  
annular anchor at said second ring with a second potting  
10 material forming a third seal; and

(h) joining a second flange cap to said second ring  
12 forming a fourth seal.

Claim 29. (Original) A filter device prepared by a process  
2 according to claim 28 wherein said encasing step (g) further  
comprises the steps (g1) through (g6):

4 (g1) attaching a second potting cap to said second ring to  
close off said second end;

6 (g2) placing said housing in said centrifuge to allow  
rotation about said axis of rotation perpendicular to said  
8 longitudinal axis of said housing, wherein said axis of rotation  
extends through said midpoint of said housing;

10 (g3) injecting said second potting material into said  
housing proximate to said second end;

12 (g4) spinning said housing in said centrifuge causing said  
second potting material to set and harden, encasing said  
14 plurality of microfibers and said second annular anchor at said  
second ring at said second end of said housing forming said  
16 third seal;

(g5) removing said second potting cap; and

18 (g6) cutting said second potting material and said  
plurality of microfibers at said second end through a second  
20 plane perpendicular to said longitudinal axis, exposing said  
interior channel of each of said plurality of microfibers at  
22 said second end.

Claim 30. (Original) A filter device prepared by a process  
2 according to claim 28 wherein said joining steps (a), (d), (e),  
and (h) further comprise the steps (a1), (d1), (e1), and (h1):

4 (a1) spin welding said first ring to said first end;

(d1) spin welding said second ring to said second end;

6 (e1) spin welding said first flange cap to said first ring;  
and

8 (h1) spin welding said second flange cap to said second  
ring.

Claim 31. (Original) A filter device prepared by a process  
2 according to claim 30 further comprising:  
forming a first plurality of nubs on an outer portion of  
4 said first ring; and  
forming a second plurality of nubs on an outer portion of  
6 said second ring;  
wherein said first and second plurality of nubs assist in  
8 said spin welding.

Claim 32. (Original) A filter device prepared by a process  
2 according to claim 30 further comprising:  
forming at least one annular channel between said first  
4 ring and said first end; and  
forming at least one annular channel between said second  
6 ring and said second end;  
wherein each of said at least one annular channel  
8 accommodates a flow of flash material during said spin welding.

Claim 33. (Original) A filter device prepared by a process  
2 according to claim 30 further comprising:  
forming at least one annular channel between said first  
4 ring and said first flange cap; and  
forming at least one annular channel between said second  
6 ring and said second flange cap;  
wherein each of said at least one annular channel  
8 accommodates a flow of flash material during said spin welding.

Claim 34. (Original) A filter device prepared by a process  
2 according to claim 28 wherein said joining steps (a), (d), (e),  
and (h) further comprise the steps (a1), (d1), (e1), and (h1):  
4 (a1) laser welding said first ring to said first end;  
(d1) laser welding said second ring to said second end;

6 (e1) laser welding said first flange cap to said first  
ring; and

8 (h1) laser welding said second flange cap to said second  
ring.

Claim 35. (Original) A filter device prepared by a process  
2 according to claim 26 further comprising:

forming a first fluid inlet port in said first flange cap;

4 forming a first fluid outlet port in said second flange  
cap;

6 forming a second fluid inlet port through said housing and  
proximate to said first end; and

8 forming a second fluid outlet port through said housing and  
proximate to said second end;

10 wherein a first fluid pathway is defined by said first  
fluid inlet port, said plurality of microfibers, and said first  
12 fluid outlet port; and

further wherein a second fluid pathway is defined by said  
14 second fluid inlet port, a space between said plurality of  
microfibers, and said second fluid outlet port.

Claim 36. (Original) A filter device prepared by a process  
2 according to claim 26 further comprising:

treating said first annular anchor and said second annular  
4 anchor with a surface treatment, wherein said surface treatment  
modifies a surface energy of said first annular anchor and said  
6 second annular anchor.

Claim 37. (Original) A filter device prepared by a process  
2 according to claim 36 further comprising:

forming a first plurality of rounded ridges on an upper  
4 surface of said first annular anchor;

forming a second plurality of rounded ridges on a lower  
6 surface of said first annular anchor;

forming a third plurality of rounded ridges on an upper  
8 surface of said second annular anchor; and

forming a fourth plurality of rounded ridges on a lower  
10 surface of said second annular anchor;

wherein said first and second plurality of rounded ridges  
12 and said third and fourth plurality of rounded ridges on said  
first and second annular anchors minimize a delamination of said  
14 first and second potting materials from said first and second  
annular anchors, and increases a surface area of said first and  
16 second annular anchors treatable through said surface treatment.

Claim 38. (Original) A filter device prepared by a process  
2 according to claim 37 further comprising:

notching a first plurality of radial channels perpendicular  
4 to said first plurality of rounded ridges on said upper surface  
of said first annular anchor; and

6 notching a second plurality of radial channels  
perpendicular to said third plurality of rounded ridges on said  
8 upper surface of said second annular anchor;

wherein said first and second plurality of radial channels  
10 allow air to escape when said first and second potting material  
is applied to said filter device.

Claims 39 through 44. (Withdrawn)

Claim 45. (Original) A filter device comprising:

2 a housing having a first end;

a first ring joinable to said first end wherein said first  
4 ring has a first annular anchor on an interior portion of said  
first ring, and further wherein said first annular anchor

6 receives a surface treatment, wherein said surface treatment  
modifies a surface energy of said first annular anchor;

8 a first flange cap joinable to said first ring forming a  
first seal;

10 a plurality of microfibers extending from said first ring  
through said housing, and

12 a first potting material encasing said plurality of  
microfibers at said first ring and encasing said first annular  
14 anchor forming a second seal.

Claim 46. (Original) The filter device according to claim  
2 45 further comprising:

a second end of said housing opposite said first end;

4 a second ring joinable to said second end wherein said  
second ring has a second annular anchor on an interior portion  
6 of said second ring, and further wherein said second annular  
anchor receives said surface treatment, wherein said surface  
8 treatment modifies a surface energy of said second annular  
anchor;

10 a second flange cap joinable to said second ring forming a  
third seal; and

12 a second potting material encasing said plurality of  
microfibers at said second ring and encasing said second annular  
14 anchor forming a fourth seal.

Claim 47. (Original) The filter device according to claim  
2 46 further comprising:

a first fluid inlet port through said first flange cap;

4 a first fluid outlet port through said second flange cap,  
wherein a first fluid pathway is defined by said first fluid  
6 inlet port, said plurality of microfibers, and said first fluid  
outlet port;

8 a second fluid inlet port through said housing and proximate to said first end; and

10 a second fluid outlet port through said housing and proximate to said second end, wherein a second fluid pathway is defined by said second fluid inlet port, a space between said plurality of microfibers, and said second fluid outlet port.

Claim 48. (Original) The filter device according to claim 2 46 further comprising:

a first plurality of rounded ridges on an upper surface of said first annular anchor and a second plurality of rounded ridges on a lower surface of said first annular anchor; and

6 a third plurality of rounded ridges on an upper surface of said second annular anchor and a fourth plurality of rounded ridges on a lower surface of said second annular anchor;

wherein said first and second plurality of rounded ridges and said third and fourth plurality of rounded ridges on said first and second annular anchors minimize a delamination of said first and second potting materials from said first and second annular anchors, and increases a surface area of said first and second annular anchors treatable through said surface treatment.

Claim 49. (Original) The filter device according to claim 2 48 further comprising:

a first plurality of radial channels perpendicular to said first plurality of rounded ridges on said upper surface of said first annular anchor; and

6 a second plurality of radial channels perpendicular to said third plurality of rounded ridges on said upper surface of said second annular anchor;

wherein said first and second plurality of radial channels allow air to escape when said first and second potting material is applied to said filter device.

Claim 50. (Original) A filter device comprising:

2 a housing having a first end;

4 a first ring joinable to said first end wherein said first ring has a first annular anchor on an interior portion of said first ring;

6 a first plurality of rounded ridges on an upper surface of said first annular anchor and a second plurality of rounded ridges on a lower surface of said first annular anchor;

8 a first flange cap joinable to said first ring forming a first seal;

10 a plurality of microfibers extending from said first ring through said housing; and

12 a first potting material encasing said plurality of microfibers at said first ring, and encasing said first plurality of rounded ridges on said upper surface and said second plurality of rounded ridges on said lower surface of said first annular anchor, forming a second seal;

14 wherein said first and second plurality of rounded ridges on said first annular anchor minimizes a delamination of said first potting material from said first annular anchor.

Claim 51. (Original) The filter device according to claim 2 50 further comprising:

a second end of said housing opposite said first end;

4 a second ring joinable to said second end wherein said second ring has a second annular anchor on an interior portion of said second ring;

6 a third plurality of rounded ridges on an upper surface of said second annular anchor and a fourth plurality of rounded ridges on a lower surface of said second annular anchor;

8 a second flange cap joinable to said second ring forming a third seal; and

12 a second potting material encasing said plurality of  
microfibers at said second ring, and encasing said third  
14 plurality of rounded ridges on said upper surface and said  
fourth plurality of rounded ridges on said lower surface of said  
16 second annular anchor, forming a fourth seal;

wherein said third and fourth plurality of rounded ridges  
18 on said second annular anchor minimizes a delamination of said  
second potting material from said second annular anchor.

Claim 52. (Original) The filter device according to claim  
2 51 further comprising:

a first fluid inlet port through said first flange cap;  
4 a first fluid outlet port through said second flange cap,  
wherein a first fluid pathway is defined by said first fluid  
6 inlet port, said plurality of microfibers, and said first fluid  
outlet port;

8 a second fluid inlet port through said housing and  
proximate to said first end; and

10 a second fluid outlet port through said housing and  
proximate to said second end, wherein a second fluid pathway is  
12 defined by said second fluid inlet port, a space between said  
plurality of microfibers, and said second fluid outlet port.

Claim 53. (Original) The filter device according to claim  
2 51 further comprising:

a first plurality of radial channels perpendicular to said  
4 first plurality of rounded ridges on said upper surface of said  
first annular anchor; and

6 a second plurality of radial channels perpendicular to said  
third plurality of rounded ridges on said upper surface of said  
8 second annular anchor;

wherein said first and second plurality of radial channels  
10 allow air to escape when said first and second potting material  
is applied to said filter device.

Claim 54. (Original) The filter device according to claim  
2 51 wherein said first annular anchor and said second annular  
anchor receive a surface treatment, wherein said surface  
4 treatment modifies a surface energy of said first and second  
plurality of rounded ridges on said first annular anchor and  
6 said third and fourth plurality of rounded ridges on said second  
annular anchor, and further wherein said first and second  
8 plurality of rounded ridges and said third and fourth plurality  
of rounded ridges increases a surface area of said first and  
10 second annular anchors treatable through said surface treatment.

Claim 55. (Original) A filter device comprising:  
2 a housing having a first end;  
a first ring joinable to said first end wherein said first  
4 ring has a first annular anchor on an interior portion of said  
first ring;  
6 a first flange cap joinable to said first ring forming a  
first seal;  
8 a plurality of microfibers extending from said first ring  
through said housing; and  
10 a first potting material encasing said plurality of  
microfibers at said first ring and encasing said first annular  
12 anchor forming a second seal; and  
at least one annular channel located between said first  
14 ring and said first flange cap;  
wherein each of said at least one annular channel  
16 accommodates a residue material during said joining of said  
first flange cap to said first ring.

Claim 56. (Original) The filter device according to claim

2 55 further comprising:

a second end of said housing opposite said first end;

4 a second ring joinable to said second end wherein said  
second ring has a second annular anchor on an interior portion  
6 of said second ring;

a second flange cap joinable to said second ring forming a  
8 third seal;

a second potting material encasing said plurality of  
10 microfibers at said second ring and encasing said second annular  
anchor forming a fourth seal; and

12 at least one annular channel located between said second  
ring and said second flange cap;

14 wherein each of said at least one annular channel  
accommodates a residue material during said joining of said  
16 second flange cap to said second ring.

Claim 57. (Original) The filter device according to claim

2 56 further comprising:

a first fluid inlet port through said first flange cap;

4 a first fluid outlet port through said second flange cap,  
wherein a first fluid pathway is defined by said first fluid  
6 inlet port, said plurality of microfibers, and said first fluid  
outlet port;

8 a second fluid inlet port through said housing and  
proximate to said first end; and

10 a second fluid outlet port through said housing and  
proximate to said second end, wherein a second fluid pathway is  
12 defined by said second fluid inlet port, a space between said  
plurality of microfibers, and said second fluid outlet port.

Claim 58. (Original) The filter device according to claim

2 56 further comprising:

at least one annular channel located between said first  
4 ring and said first end; and

at least one annular channel located between said second  
6 ring and said second end;

wherein each of said at least one annular channel  
8 accommodates a residue material during said joining of said  
second ring to said second end.

Claim 59. (Original) The filter device according to claim  
2 56 wherein said first annular anchor and said second annular  
anchor receive a surface treatment, wherein said surface  
4 treatment modifies a surface energy of said first and second  
annular anchors.

Claim 60. (Original) The filter device according to claim  
2 59 further comprising:

a first plurality of rounded ridges on an upper surface of  
4 said first annular anchor and a second plurality of rounded  
ridges on a lower surface of said first annular anchor; and

6 a third plurality of rounded ridges on an upper surface of  
said second annular anchor and a fourth plurality of rounded  
8 ridges on a lower surface of said second annular anchor;

wherein said first and second plurality of rounded ridges  
10 and said third and fourth plurality of rounded ridges on said  
first and second annular anchors minimize a delamination of said  
12 first and second potting materials from said first and second  
annular anchors, and increases a surface area of said first and  
14 second annular anchors treatable through said surface treatment.

Claim 61. (Original) The filter device according to claim  
2 56 further comprising:

a first plurality of radial channels perpendicular to said  
4 first plurality of rounded ridges on said upper surface of said  
first annular anchor; and

6 a second plurality of radial channels perpendicular to said  
third plurality of rounded ridges on said upper surface of said  
8 second annular anchor;

wherein said first and second plurality of radial channels  
10 allow air to escape when said first and second potting material  
is applied to said filter device.

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